**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| In re the Application of: | **Confirmation No.:** 1125 |
| **Inventor(s): Riddell, Cameron** | **Group Art Unit:** 3643 |
| **Serial No.:** 10/729,330 | **Examiner:** Kurt C. Rowan |
| **Filed:** December 4, 2003 | |
| **For:** Electric Deterrent Device | |
| **Customer No.:** 34026 | |

## AMENDED APPEAL BRIEF

**Mail Stop Appeal Brief - Patents**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This amended brief in filed in response to the Notice of Non-Compliant Appeal Brief. Accordingly, this amended brief supercedes the appeal brief filed on July 13, 2007. The points of non-compliance have been corrected herein. An appropriate Request for Extension to file accompanies this Brief.

CERTIFICATE OF MAILING (37 C.F.R. §1.10)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as 'Express Mail Post Office To Addressee' in an envelope addressed to the Mail Stop Appeal Brief - Patent, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| EV 951289572 US | Jennifer Tai |
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| February 13, 2008 | |
| Date of Deposit | Signature of Person Mailing Paper |

This brief is an appeal from the Office Action mailed June 16, 2006, finally rejecting claims 1-27.

## I. REAL PARTY IN INTEREST

The real party in interest is Bird Barrier America, Inc., the assignee of the present application.

## II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

## III. CLAIMS ON APPEAL AND STATUS OF CLAIMS ON APPEAL

Claims 1-27 are pending and finally rejected in the June 16, 2006 Office Action. There were no restrictions or elected claims.

Claims 1 to 27 are the **Claims on Appeal**.

All Claims 1 to 27 stand **REJECTED**. None of these claims has been allowed, withdrawn, objected to or cancelled.

## IV. STATUS OF AMENDMENTS

Although several proposed amendments to the claims after final have been lodged, none has yet been entered. Accordingly, the currently operative Office Action is that mailed June 16, 2006.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

### A. Brief description of the claimed subject matter.

The claimed invention is a pest deterrent device that includes at least two braided conductive element that are sewn to a non-conductive, flexible, extruded base such that when the base is bent in either convex or concave fashion, at least a portion of the stress that such flex places on the braided conductive elements is absorbed by the individual strands in the conductive elements expanding

apart from, or contracting towards, one another. (See *e.g.*, Figs. 1, 6, 7, 8 and 9; Appl. ¶¶ 010, 011, 012, 024, et seq).

This type device, which will find primary utility as a bird deterrent device, fulfills a long felt need for an effective electric deterrent that can be attached to other than flat surfaces, and when attached can more effectively withstand the rigors of the weather, differing coefficients of expansion between the base and the conductive elemenst, and other hazards, such as being stepped on or crushed by, for example, window washers and their equipment.

As a review of the prior art will show, creating such a flat, flexible, effective deterrent device that will allow it to be attached to radically curved surfaces without breaking down, that will stand up to constant exposure to the elements, and periodic but repeated abuse by window washers, that keeps the conductive elements in place, and at the same time, keeps the conductive elements properly exposed to the bird or pest to be deterred such that incidental contact will be with both elements thus generating the electric shock, has proven elusive.

The evidence in the record will also show, in addition to long felt need and attempts by other, slavish copying, all of which present compelling secondary considerations of the non-obviousness of the claimed invention.

**B. Mapping of Independent Claims 1 and 16 to Specification**

In the following mapping, each aspect of independent claims 1 and 16 is followed by a reference in **bold** to the applicable paragraph number and/or Figure(s) of the specification that support the structure or function described:

Claim 1: An electric deterrent device comprising: **[¶001, Fig. 1]**

a) a base having at least two areas which are of a non-conductive material; **[¶024, Figs 1, 2 and 4]**

b) said base being attachable to a surface; **[¶024]**

c) at least a pair of electricity conducting elements attached to said non-conductive areas of said base, each said element comprising a plurality of smaller strands braided together to form each said element, wherein when said base is bent in convex or concave flex the compression or extension stress placed on said braided elements is substantially absorbed by individual strands expanding apart from, or contracting towards, one another; and **[¶¶ 024, 028, 029, Figs 1, 2, 4, 5, 6, 7, and 8]**

d) said braided elements being attachable respectively to the positive and negative terminals of a power source. **[¶001, 004, 0032].**

Claim 16: In an electrical animal, pest or bird deterrent device comprising a base that is attachable to the surface from which the animal, pest or bird is to be deterred, and at least a pair of electrically conductive elements attached to the base and attachable to a power source, the improvement comprising said conductive elements comprising a plurality of individual strands woven together in a braid-like fashion, wherein when said base is bent in any direction, the stress placed on said conductive elements is substantially absorbed by said individual strands moving relative to one another. **[¶¶ 001, 024, 028, 029, 032, Figs 1, 2, 4, 5, 6, 7, and 8]**

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

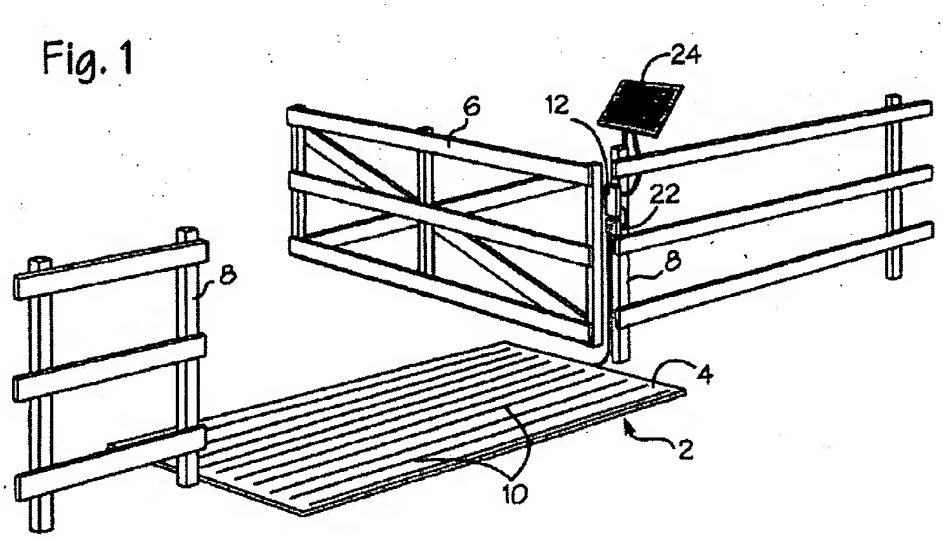
In the Final Office Action dated June 16, 2006, then pending Claims 1-27 were rejected under 35 U.S.C. §103(a) over Spooner, USPat.App.Pub.No. 2002/0092481.

In the Office Action, claims 1 and 16 were rejected under 35 U.S.C. § 103(a) in view of Spooner (U.S. Patent Publication No. 2002/0092481).

## VII. ARGUMENT

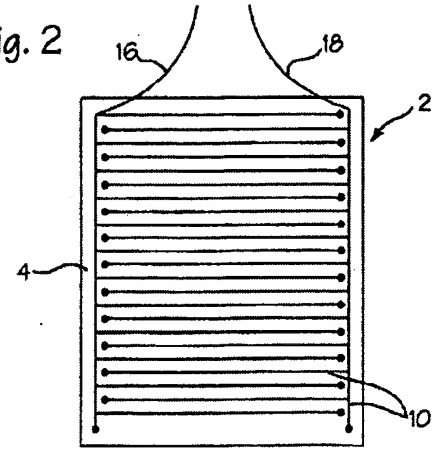
### A. Spooner Does Not Teach or Suggeset the Invention as Claimed

Spooner presents an electrified flat mat with a criss-cross of wires. Because the Spooner device is apparently intended primarily for use with large animals (such as cows and horses), Spooner indicates in Paragraph 0021 that his device does not even need a ground wire because the trespassing animal's front feet will be on the mat, and its back feet on the ground (and thus grounded) so as to receive the electric shock, as shown in this Figure:




It is in that instance that Spooner references the possible use of "mesh wiring" which is plainly not the same as the braided wire used in the instant application. The "mesh wiring" in Spooner is a cross-hatched grid of wires that can be lain into the criss-crossed grooves in a large, substantially retangular mat having substantial and substantially similar length and width, as shown in this Figure:

Fig. 2




Accordingly, Spooner neither anticipates nor renders the instant invention obvious.

Since the Final Office Action, an attorney for the company that has marketed a copy of the claimed invention has made severral submissions of prior art under 35 USC § 301. During interviews with the Examiner to discuss the prior art submitted, applicant has come to believe that the Examiner considers one such prior art reference, Bailey (WO1984004022A1), to be the most relevant prior art of record, and more relevant than Spooner. Accordingly, applicant will also here respond to that prior art as well, to show that the invention is not anticipated by Bailey alone or rendered obvious by Bailey in combination with any other prior art of record, including US6,341,550 (which the Examiner has also more recently noted in an Advisory Action).

### B. Bailey, Alone or In Combination, Does Not Teach or Suggest the Invention as Claimed

The disclosure by Bailey relates generally to an electric device for deterring birds that might land on "the deck, roof or **other flat surface** and immediately walk to the gunwale for a view of the water." (Page 1, lines 32-33, emphasis added). Bailey later reiterates that his focus is on protecting a "broad" and "horizontal" surface. (Id. Page 2, lines 4-5, and page 3, lines 10-16 and 23-24). In other words, Bailey's focus was directed primarily to such surfaces, and there was no need for him

to consider, and he did not consider, discuss or disclose, the design requisites for a device that could be attached to a radically curved surface in addition to a relatively flat, horizontal (and typically, broad) surface.

Bailey then discloses three embodiments for use on these relatively flat surfaces: Firstly, if the boat deck is constructed of timber or fiberglass (that is, a non-conductive material), then the "conduction means are flat metal ribbons which are laid in parallel pairs closely-spaced along the surface of the boat . . ." and attached directly to it by adhesive tape. (Page 2, lines 14-20).[1] Secondly, if the boat is constructed of metal, then "a single conductor can be laid over the boat insulated therefrom by a thin ribbon insulator."[2] (Page 2, lines 21-23). Thirdly, instead of attaching the conductive element(s) directly to the boat surface, "it may be instead affixed upon a plastics sheeting which can be laid out and recovered [from the boat deck] as desired." (Page 5, lines 5-7).

Thus, there is no discussion of, or teaching with respect to, creating a **flexible** deterrent device that is designed for attachment not only to flat surfaces, but also to **curved** surfaces as well. As the prior art of record shows, there are any number of electric deterrent devices that have been designed to be attached to relatively flat surfaces, and very few that have tried to create an effective electric deterrent device for attachment to both flat and radically curved surfaces. And Bailey is of the former, not the latter. In fact, the words "flexible" or "curve" or "curved" don't even appear

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[1] In this embodiment, there is no need for an insulation because the boat surface itself is insulating. Bailey also discloses laying the closely-spaced pairs "upon a common insulating layer" (page 4, lines 36-37). This is a bit confusing, since Bailey uses the "closely-spaced pairs" only with the timber or fiberglass boat that doesn't require an insulating layer. The most reasonable interpretation of this statement seems to be that by "common insulating layer" Bailey was referring to the "plastics sheeting" in the third embodiment discussed *infra*.

[2] In this instance, the metal boat surface as the "ground" so only a single "hot" conductive element is used.

anywhere in the Bailey disclosure.[3] Not once. Not surprisingly, nor is there any reference or teaching within Bailey as to how his device would be attached to a curved surface.

Also, Bailey provides scant disclosure or teaching as to the "insulating layer" and nothing that teaches or suggests the **extruded** elongate flexible base of the current device. The only descriptive references in Bailey to the insulating layer is that it is a "thin ribbon insulator" (page 2, line 24), or a "thin insulating layer" (page 3, line 25), a "thin underside electrically insulating layer" (page 4, lines 29-30), or a "plastics sheeting" (page 5, line 9).[4]

Therefore, Applicant respectfully suggests that Bailey lacks the important base element, which base can be flexed radically in either a convex or concave fashion without damaging either the base or the attached conductive elements, as described and claimed.

Similarly, although Bailey does mention that the conductive element can be "sewn," there is no teaching whatsoever in Bailey as to any aspect of that sewing, or as to any resultant interaction between the manner of sewing and the ability of the individual strands of the sewn braided element to expand or contract after being sewn.

Regarding sewing, Bailey includes, in total, exactly two mentions of the word "sewn" and absolutely nothing else on the subject. Therefore, Bailey's teachings in that regard are nothing more

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[3] Bailey describes the surfaces for possible application of his device as being "moored boats, the coping and cornices of buildings, railings and the like" (page 1, lines 5-6), the "upper portion of the rail" (page 1, line 37), the "topside of rigging" (page 3, line 33) and the "topside of a metal rail" (page 3, line 35) – all relatively straight, flat surfaces. The embodiments shown and described, however, are all attached to a boat deck surface.

[4] Bailey does indicate that one of the conductive elements could be "supported in a raised (or shielded) position" (page 5, line 10), but does not provide any description as to how that "raised position" would be obtained. Given the complete lack of any such description, and the other and repeated references to the "**thin** insulating layer," it is more likely that Bailey would have used a separate shimming element to raise the conductive element. More importantly, this brief reference to "raised position" does not in any way teach or suggest the extruded flexible base being used here.

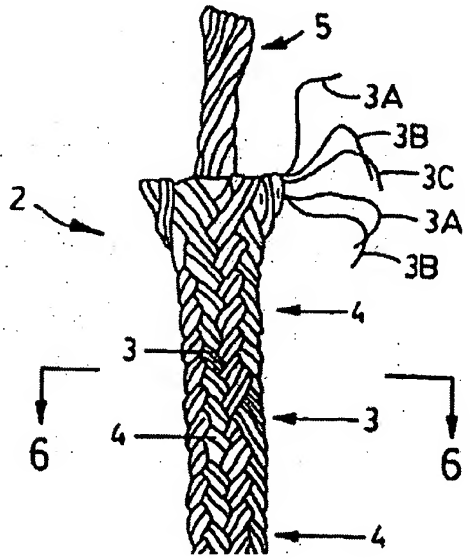
than a recognition, as we have seen in the other prior art of record, that sewing can be used to attach wire to a substrate material. Like all the other prior art of record, however, Bailey says nothing at all about the intended interaction of the braid relative to the flexible extruded base after sewing and during flex. In the invention here, and as now even more clearly spelled out in the amended claims, the braids are attached by sewing in which the braids are very securely attached to the base, but in a fashion that after being sewn the width of the braids remain free to expand and contract as the individual strands within each said braided element can move as the base is flexed. There is nothing at all in Bailey that teaches or suggests this result.

There is a very good reason for this. First, as mentioned above, Bailey was not at all concerned about creating a device that could be used on curved surfaces. So Bailey didn't need to be, and was not concerned about, creating either a flexible base or addressing the stress and strain that the conductive elements would have to withstand in a flexed position. This is made all the more clear in that Bailey also spells out "metallised plastics tape" as an alternative conductive element (page 5, lines 16-17). Of course, this type of metallic tape would not stand up to being twisted and subjected to stresses and strains in flex.

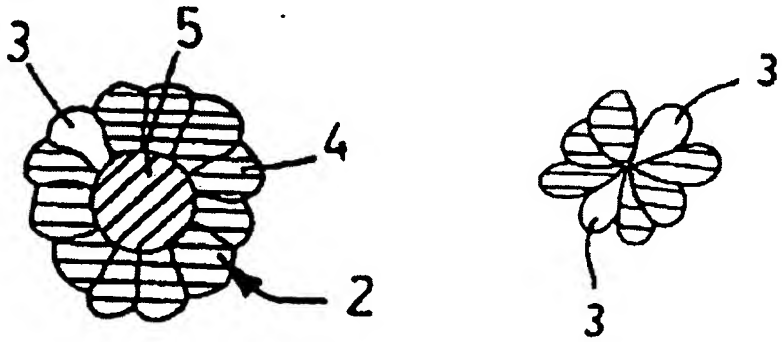
Second, even though Bailey uses the term "braid" for the conductive element, he specifies it is "of the type known as "Monel" mesh sewn to the insulating layer" (page 5, lines 15-17). The metal mesh to which Bailey refers typically has perpendicularly juxtaposed warp and weft strands that are rigidly attached to one another with a specific alignment (as in screens of a particular "mesh" size), so there is no possibility of any movement of the individual strands as is called for in this invention.

The Examiner has more recently indicated that a proposed amendment after final would not be entered as it would not place the claims in the condition for allowance, citing to the combination

of Baily and US6341550. The '550 patent shows an "Electrobraid fence" that is constructed of a braided material that is constructed as a "rope' [*see Summary of Invention*: "[T]his invention to privide an improved electric fence rope . . ." Col. 3, lines 15-16]. This is depicted here:




It is the "rope-like" aspect of this invention which is key in order to provide the stength and resistence to damage that it needs in use. Therefore, the rope is actually "formed on equipment used to braid ropes for the marine yachting industry, e.g. for sail halyards and spinnaker sheets." [Col. 6, lines 52-54]. The resultant rope is quite tightly wound in a rope-like fashion rather than braid-like fashion, and is round in configuration, as shown in the attached Figures:



Clearly, none of the individual strands in the '550 patent are designed and constructed to be sewn to a flexible base, nor is there any suggestion that the rope is to be sewn to an underlying flexible base. Also, nothing in the '550 patent shows or suggests that even if sewn to a flexible base, the individual strands would absorb the stress placed on the base in curvature by expanding apart or contracting towards one another. Indeed, given the cross-sectional aspects of the rope shown in the '550 patent, that would not be possible.

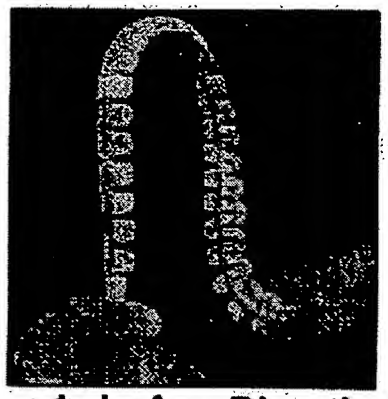
Therefore, Bailey alone or in combination with the '550 patent does not teach or suggest this inventive concept regarding the sewing and the interaction of the individual strands of the sewn braid to absorb stress. Only through hindsight could one skilled in the art obviously start with Bailey and the '550 patent and end up the claimed invention. Hindsight evaluation of obviousness of course remains inappropriate. *KSR Int'l v. Teleflex, Inc.*, 127 S.Ct. 1727 (2007). More importantly, the combination of Bailey with the '550 patent actually teaches away from the present invention.

**C. Objective Indicia of Non-Obviousness**

As the Supreme Court has stated, objective indicia of non-obviousness must be taken into consideration when evidence of them is in the record. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966); *KSR Int'l, supra*,. *See also, Alza Corp. v. Mylan*, 464 F.3d 1286, 1289-90 (Fed.Cir. 2006)(in addition to taking the objective indicia into consideration, there must be some "reasonable expectation of success" in a Section 103 evaluation that is not reliant on "hindsight" in light of the current applicant's teaching"). Here, evidence of unsuccessful efforts and copying by others is not only in the record, it stands admitted *sub silencio* by Bird B Gone's attorney.[5]

[5] See the 5th Fish Submission filed in response to Applicant's Reply to the 4th Fish Submission. In Applicant's Reply, it is stated that "Bird B Gone . . . has slavish copied the invention disclosed in this application (as shown in prior submissions by Applicant)." Although the 5th Fish Submission took issue with other statements made by Applicant in the Reply, the 5th and 6th Fish Submissions do

Bird B Gone's flexible electric deterrent product (that is, before it saw and copied the invention here) was not the device shown in Bailey, or even anything remotely close to it. Rather, Bird B Gone's prior product offering in the flexible electric deterrent device category was its "Shock Track" device, shown here in a picture copied from the Bird B Gone website:




That device is also the subject of USPNo. 6,283,064, Figure 3 of which is depicted here:

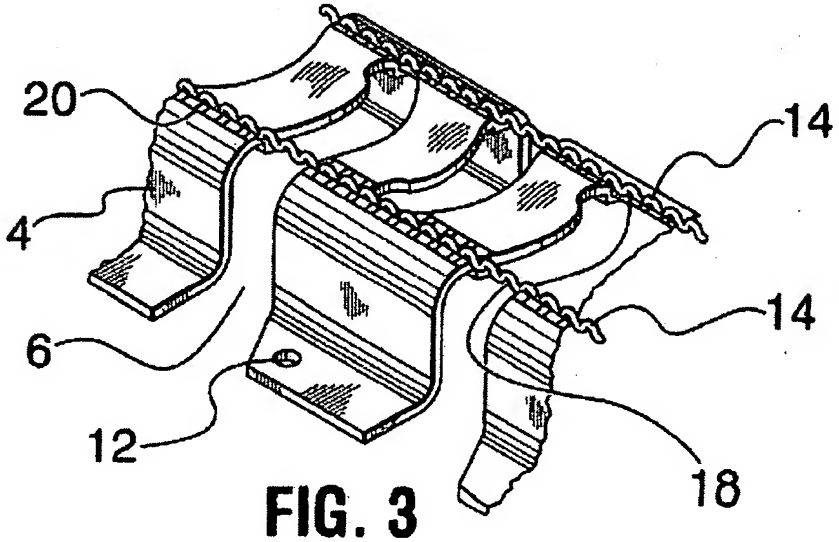
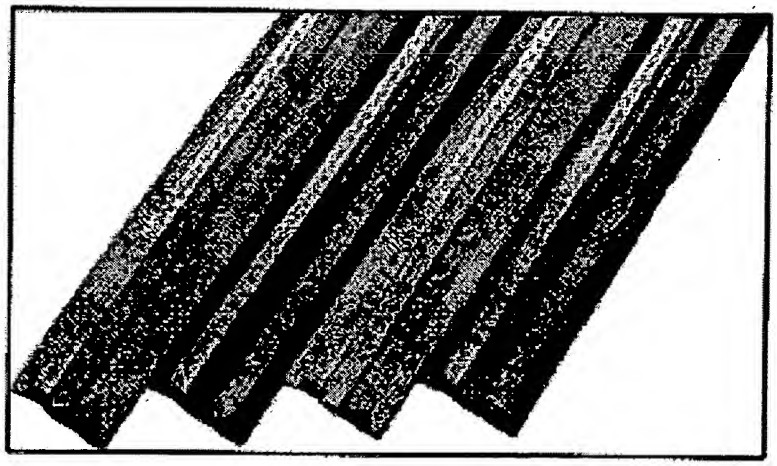



FIG. 3

not dispute the statement regarding slavish copying of the invention by Bird B Gone, whom attorney Fish represents.

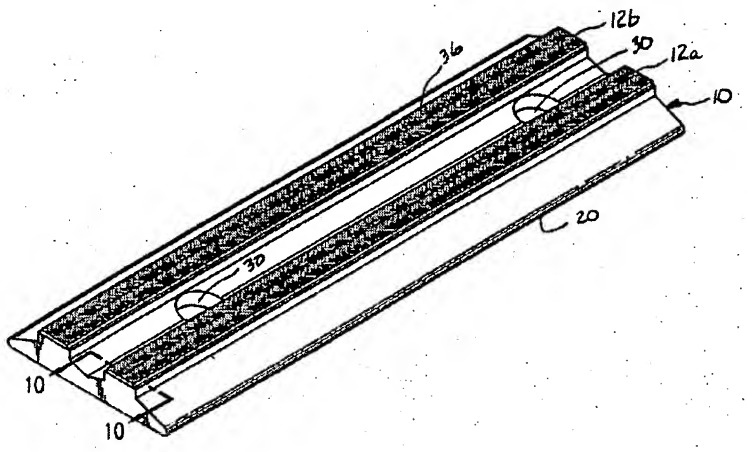
This device uses metal strips 14 that are attached to a plastic base 4. The base has a number of gaps **6** and thus is articulated so as to allow it to be bent for attachment to non-flat surfaces. The wires 14 are "crimped in undulating fashion along their length, to provide them with give so that they will not disassociate from the base when it is bent or when the wires and base expand or contract at a different rate." ('064 patent, claim 1). And this device attaches the wires to the base "by a plurality of jaw like clips formed integrally with the strip along its upper surface, the clips positioned to grip and secure the wires at low points on the undulations of the wires." (*Id.*, claim 3).

Once Bird B Gone saw the product of the instant invention, however, here is the product it introduced (shown in a photograph copied from the Bird B Gone website):




As can be seen, the Bird B Gone device includes two braided elements that are attached by sewing to spaced apart areas on the flexible, extruded plastic base, separated by a non-conductive portion. The braided elements are sewn in such a way that when the base is flexed, the individual interwoven strands of the Bird B Gone product move, expanding or contracting laterally in order to

partially absorb the flex stress. It is a direct copy of the invention claimed here, as shown in this Figure from the pending application:[6]




Imitation is not only the truest form of flattery, here it is also strong objective indicia of non-obviousness of the claimed invention.

Another prior art attempt to design a device that could be attached to both flat and curved surfaces is that developed by a company Ecopic and shown in USPNo. 6,006,698, depicted here:

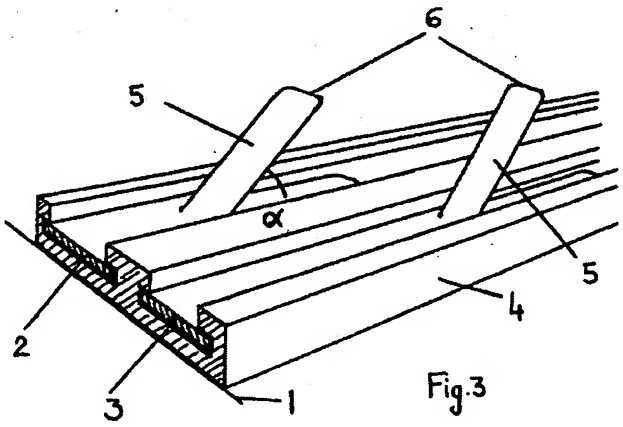



Fig.3

[6] The only differences are insignificant modifications in the cross-sectional shape of the base. Otherwise, it directly copies the inventive elements as claimed.

As seen here, the Ecopic device has solid metal strips **2** and **3** as the conductive elements housed within C-channels formed in the flat base **4**. Because the electric conductive strips are housed within the base as opposed to being on an upwardly exposed pedestal area, however, the Ecopic device had to go to the trouble of creating bent tabs **5** all along the length of each strip so that the bird (or other pest) may actually come into contact with both strips at the same time to receive the electric shock.

Because the strips **2** and **3** are solid, when the base/strip combination in the Ecopic device is bent, there is no "give" in the strip, so it slips within the channel (for example, if the base is curved convexly, the strips will pull inwardly, away from the ends of the base, making attachment of adjacent ends more difficult).

These features limit its effectiveness.

Thus, the Ecopic product and two Bird B Gone products discussed here graphically depict need, efforts, and then copying by others, all of which provided incredibly strong objective indicia of non-obviousness. Again, the Supreme Court's decision in *KSR* reconfirmed the importance of these objective indicia in any obviousness evaluation.

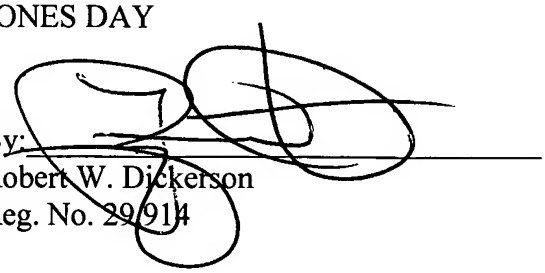
No combination of the prior art shows or suggests a pest deterrent device having sewn-to-an-extruded-base braided elements and the flex aspect of the type disclosed and claimed here. Nor is there any reasonable expectation that Bailey alone or in combination with any other prior art of record, including the '550 patent, would lead to the successful result for a truly flexible electric deterrent device as is shown and claimed in this application.

Accordingly, for the foregoing reasons, the claims on appeal should be allowed.

Respectfully submitted,

JONES DAY

Dated: February 13, 2008

By: 
Robert W. Dickerson
Reg. No. 29,914

555 South Flower Street, 50th Floor
Los Angeles, California 90071
213-489-3939 phone
213-243-2539 fax
rwdickerson@jonesday.com

## VIII. CLAIMS APPENDIX

The following claims, as amended during prosecution, are on appeal.

## LISTING OF CLAIMS:

Claim 1 (currently amended, second amendment): An electric deterrent device comprising:

a) a base having at least two areas which are of a non-conductive material;

b) said base being attachable to a surface;

c) at least a pair of electricity conducting elements attached to said non-conductive areas of said base, each said element comprising a plurality of smaller strands braided together to form each said element, wherein when said base is bent in convex or concave flex the compression or extension stress placed on said braided elements is substantially absorbed by individual strands expanding apart from, or contracting towards, one another; and

d) said braided elements being attachable respectively to the positive and negative terminals of a power source.

Claim 2 (original): The invention of claim 1 wherein said strands of said elements are substantially round.

Claim 3 (original): The invention of claim 1 wherein said strands of said elements are substantially flat.

Claim 4 (original): The invention of claim 1 wherein said elements are attached to said base by sewing.

Claim 5 (original): The invention of claim 1 wherein said braided elements have a substantially flat cross sectional configuration.

Claim 6 (original): The invention of claim 1 wherein said braided elements are attached to said base by an adhesive such as glue.

Claim 7 (original): The invention of claim 1 wherein said braided elements are attached to said base by sewing, gluing and heat welding.

Claim 8 The invention of claim 1 wherein said braided elements are attached to said base by screws, or staples.

Claim 9 (original): The invention of claim 1 wherein a plurality of said strands are stainless steel.

Claim 10 (original): The invention of claim 1 wherein a plurality of said strands of are copper.

Claim 11 (original): The invention of claim 1 wherein a plurality of said strands are zinc coated copper.

Claim 12 (original): The invention of claim 1 wherein said base is constructed of cellular, rigid or flexible polyvinyl chloride.

Claim 13 (original): The invention of claim 1 wherein said base is constructed of any elastomeric material.

Claim 14 (original): The invention of claim 1 wherein each said braided element resides within an appropriately sized channel within said base.

Claim 15 (original): The invention of claim 1 in which said braided element comprises some strands of a conducive material and other strands of a non-conductive material.

Claim 16 In an electrical animal, pest or bird deterrent device comprising a base that is attachable to the surface from which the animal, pest or bird is to be deterred, and at least a pair of electrically conductive elements attached to the base and attachable to a power source, the improvement comprising said conductive elements comprising a plurality of individual strands woven together in a braid-like fashion, wherein when said base is bent in any direction, the stress placed on said conductive elements is substantially absorbed by said individual strands moving relative to one another.

Claim 17 (original): The invention of claim 16 in which said elements are attached to said base by sewing.

Claim 18 (original): The invention of claim 16 in which some of said individual strands are made of a conductive material and some are not.

Claim 19 (original): The invention of claim 16 in which said strands are made of metal.

Claim 20 (original): The invention of claim 19 in which said strands are constructed of stainless steel, copper, or zinc plated copper, or a combination thereof.

Claim 21 (original): The invention of claim 16 in which said base is constructed entirely of a non-conductive material.

Claim 22 (original): The invention of claim 16 in which said base is constructed entirely of cellular, flex or rigid polyvinyl choride.

Claim 23 (original): The invention of claim 16 in which said base is constructed entirely of a material selected from the group of neoprene, fluoroelastomer, silicone, natural rubber, buna n (nitrile), buna s (SBR), thermoplastic rubber, synthetic polyisoprene, EPDM and polyurethane.

Claim 24 (original): The invention of claim 16 in which said strands are substantially circular in cross section.

Claim 25 (original): The invention of claim 16 in which said strands are substantially flat in cross-section.

Claim 26 (original): The invention of claim 16 in which said strands are woven tightly together.

Claim 27 (original): The invention of claim 16 in which said strands are woven loosely together.

## IX. EVIDENCE APPENDIX

1. Exhibit A is Bailey (WO1984004022A1).

## X. RELATED PROCEEDINGS APPENDIX

None.

# Exhibit A

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 3 : A01M 29/00 — A1

(11) International Publication Number: WO 84/ 04022

(43) International Publication Date: 25 October 1984 (25.10.84)

(21) International Application Number: PCT/AU84/00067

(22) International Filing Date: 19 April 1984 (19.04.84)

(31) Priority Application Number: PF 8958

(32) Priority Date: 19 April 1983 (19.04.83)

(33) Priority Country: AU

Published
*With international search report.*

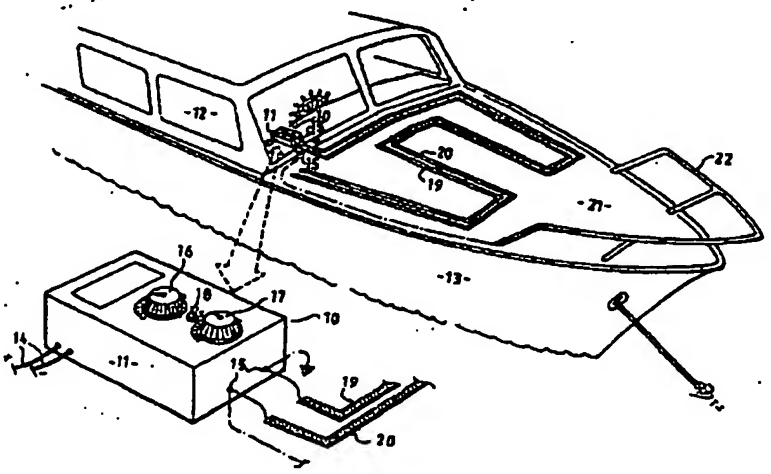
(71) Applicant *(for all designated States except US)*: BAILEY, Richard, John [AU/AU]; 14 Lockwood Street, Merrylands, NSW 2160 (AU).

(71)(72) Applicant and Inventor: HARVEY, Joseph, Edward, George [AU/AU]; 3/25 View Street, Chatswood, NSW 2067 (AU).

(74) Agent: SPRUSON & FERGUSON; GPO Box 3898, Sydney, NSW 2001 (AU).

(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), FR (European patent), GB (European patent), JP, LU (European patent), MC, NL (European patent), SE (European patent), SU, US.

(54) Title: BIRD DETERRENT




(57) Abstract

A device for deterring birds from perching on a broad surfaced structure such as a boat or building, wherein electrically pulsed conductors are applied to the surface in a widely-spaced pattern of lines which will enable a bird to walk between adjacent lines but which are crossed in the bird's passage to an edge of the surface. The electric pulse is of a quality harmless to the bird but sufficient to alarm it.

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"BIRD DETERRENT"

The present invention relates to bird deterrent means. In particular, the invention is directed to a device for deterring birds from perching or roosting on moored boats, the coping and cornices of buildings, railings and the like.

BACKGROUND ART

Owners of moored boats have long recognised, and suffered, the problem of birds perching on the boats. Not only do the birds leave feathers and excrement behind, but they also pose a health risk since they can introduce lice on to the boat. Many measures have been taken to deter birds from perching on boats. Such measures include wooden cut-outs painted as fierce blackhawks hung from shrouds, brightly coloured webbing and netting hung over the boat, brightly coloured streamers strung along the boat, tape recordings of the cry of the feared kittyhawk, and even a dead seagull hung upside down from the boom. While such measures may be of some effect initially, their deterrent value diminishes after a relatively short time as the birds become accustomed to the devices employed. For example, seagulls have been observed sheltering from the wind behind cut-outs of blackhawks, and perched on lines of streamers. Furthermore, such deterrents are either costly or of inconvenience to the boat owner.

In developing a solution to this problem the perching habits of birds have been studied. It has been observed that in the case of some species a preference is shown for perching upon a railing, while in other instances, especially in the case of seagulls which are perhaps the most troublesome birds to boat owners, the bird will alight upon the deck, roof, or other flat surface and immediately walk to the gunwale for a view of the water. A solution to the problem has taken into account these perching characteristics.

It is an object of the present invention to provide a means for alleviating the problem to boat owners and others caused by the undisturbed perching, or roosting, of birds.

DISCLOSURE OF INVENTION

According to the present invention, there is disclosed a device for deterring birds from perching, or roosting, on a moored boat, a building or other structure having a broad surface attracting birds for perching, said device comprising electrical circuit means for generating a pulsed electrical voltage at an output, and electrical conduction means supported upon said surface and connected to said output to form electrically charged regions, said regions being arranged in lines in a spread-out pattern with said lines so widely spaced and located to permit movement of a bird between said lines but requiring to be crossed by the bird in its passage to an edge of the surface.

Preferably, the conduction means are flat metal ribbons which are laid in parallel pairs closely-spaced along the surface of the boat, or structure, so that when a bird's foot bridges the conductors, it will receive an electric shock from the voltage pulses. In the case of a boat such an arrangement is adequate if the craft is composed of timber, or fibre glass.

Alternatively, in the case of a metal hull, a single conductor can be laid over the boat insulated therefrom by a thin ribbon insulator, the other terminal of the output of the electrical circuit means being connected to the boat body. Thus, when a bird provides an electrical path between the conductor and the boat body, it will receive an electric shock.

Typically, the electrical circuit means provides a high voltage/low current pulse output which shocks the bird, but does not harm it. The shock is a sufficient deterrent to frighten the bird from th boat and, unlike other known deterrents, birds do not become accustomed to such electrical shocks.

If it be found that birds are perching only on a particular portion of the boat, e.g. the metal bow railing, a conductor insulated from the rail need only be arranged on the upper portion of the rail and the other terminal of the output of the electrical circuit means connected directly to the rail.

It will be seen that the present invention utilizes the principle of electric fences which are used to restrict cattle within a certain area. However, such known electric fences cannot be applied directly to boats, or the other structures referred to above since the voltages used are not suitable and the arrangement of the conductors and their insulation from fence posts are inapplicable to boats. In the case of an electrical fence the earth is one terminal of the applied power.

The pattern of the electrical charged regions is broad, i.e. quite widely spaced in the order of at least 300 mm. Narrow spacing might at first be considered necessary to ensure that an alighting bird does not avoid contact with the regions. Such close spacing of the electrical conductors would detract from the appearance of a boat as well as add considerably to the cost. However, as mentioned previously the perching habit of many of the troublesome birds which entail early movement of the bird towards the gunwale enables the pattern of the ines of conductors to be widely spread and therefore intercept the movement of the bird shortly after alighting.

In the present invention, the conduction means is preferably constructed as flat ribbon which can be adhered to the horizontal surfaces of the hull and cabin of the boat but is insulated from the surface by a thin insulating layer provided with a pressure-sensitive adhesive. Electrical conductor strips are exposed on the topside of the ribbon for contact with the bird. In this manner, the conductors need only be laid on those portions from which the birds are to be deterred, and the high voltage pulses do not interfere with other electronic equipment on board the boat. The same ribbon may be used on the topside of rigging.

Where it is intended to deter birds from perching on metal railing, the ribbon applied on the topside of the metal rail requires only a single electrical conductor with the opposite terminal of the electrical circuit means connected directly to the metal rail.

## BRIEF DESCRIPTION OF DRAWINGS

Notwithstanding any other form of the invention, a

preferred embodiment thereof will now be described with reference to drawings in which:

Fig. 1 is a partial diagrammatic representation of a marine launch to which the bird deterrent device according to the invention has been applied;

Fig. 2 is a perspective of an electrical control for said device; and,

Fig. 3 is a circuit diagram of the electrical voltage pulser.

BEST MODE OF CARRYING OUT THE INVENTION

As shown in Figs. 2 and 3, the control 10 for the bird deterrent device includes an electrical circuit (Fig. 3) in a housing 11 which can be affixed in the cockpit 12 of the boat 13 (Fig. 1). The input of the control 10 is connected to a D.C. voltage supply, typically a 12 volt battery, by leads 14. A pulsed output voltage is provided at the output terminals 15 of the control 10. The amplitude of the voltage pulses can be controlled by switch 16 and the frequency of the pulses can be varied by a control 17. A light emitting diode 18 can also be provided to indicate the impulse timing.

A pair of conductors 19 and 20 are connected to respective output terminals 15 of the control 10. The conductors 19 and 20 are flat metal ribbon conductors with an adhesive coating on their underside so that they can be affixed to a broad surface of the boat such as the deck 21 from which the birds are to be deterred from perching. Preferably, the conductors 19 and 20 are spaced about 15 mm apart and also include a thin underside electrically insulating layer which insulates the live conductor from the boat deck 21. The pair of conductors 19,20 are laid parallel and closely spaced so that a bird's foot can span both conductors 19,20. A bird thereby provides a conductive path between the conductors 19,20 and will receive an electric shock from the next voltage pulse produced by the control 10. Both conductors 19 and 20 may be carried upon a common insulating layer.

Alternatively, the ribbon may carry a single electrical conductor, say conductor 19, upon the insulating

layer with the output terminals 15 connected respectively to the conductor 19 and the metal railing 22 of the boat, or to the deck 21 if composed of metal. Although in most instances the ribbon of conductors 19 and 20, or conductor 19 alone, will be permanently attached to the deck 21, it may be instead affixed upon a plastics sheeting which can be laid out and recovered as desired. Also whether conductors 19 and 20 are supported directly upon the deck 21 or the plastics sheeting, at least one of the conductors 19, 20 may be supported in a raised (or shielded) position to minimise any shorting effect which might be created by the presence of dew or rain. Furthermore, connection from the output terminals 15 of the control 10 to the conductors 19 and 20 is via clamps or even a stud fastener (not shown), while each conductor 19 and 20 may be a flexible metal braid, of the type known as "Monel" mesh sewn to the insulating layer, or may be a metallised plastics tape.

The electrical circuit for the control 10 is shown in Fig. 3. The circuit is powered from a voltage supply which may be from 9V to 28V DC. A voltage regulator LM 317T is connected to the voltage supply so as to provide a steady voltage power supply to the circuit. Diode D1 is used as a protection diode and capacitor C1 as a filter capacitor. Resistors R5 and R6 adjust the output voltage of the regulator to approximately 8V.

Oscillations produced in the windings W1 and W2 of transformer T1, using ancillary network Q2, resistors R7 and R8 and capacitors C2 and C4 cause approximately 120 volts to appear across the winding W3. This voltage is fed to a half-way rectifier D2 which in turn charges a 0.47 uf metallized polyester capacitor C5 which is connected in series with the primary winding W1 of coil T2 which has approximately 200 terms. This charge of the capacitor 35 produces approximately 2KV in the secondary winding W2 which has approximately 5000 turns.

A 2N 6027 programable unijunction transistor (PUT) Q1 initiates a discharge cycle by supplying a brief pulse to the gate G of the SCR. This causes the SCR to turn on, discharging the capacitor C5 through the coil W1. The SCR

will remain on until the discharge current falls below its "hold on" current. The rate at which the PUT transistor supplies trigger pulses to the SCR depends on two factors, viz. a reference voltage set on its own gate by the ratio of resistors R2 and R3, and the time constant of resistor R4 and capacitor C3. When capacitor C3, and hence the anode A of transistor Q1, reach a voltage of 0.6V higher than the reference voltage, the device switches on. This allows the capacitor 3C to discharge into the gate G of the SCR thereby supplying a trigger pulse. The neon fires at approximately 90V through resistor R10 and is used as an indicator. The pulse produced with a 50 ohm load, approximately once every second, will have a voltage of 2KV at 250mA.

The circuit imposes only a small drain on the voltage supply, typically 25mA into a 500 ohm load at 2KV. Accordingly, battery life will not be a problem. Furthermore, when a high voltage shock is imparted to a bird, only a negligible amount of current, and hence power is used. The device can be activated merely by a flick of a switch and will not interfere with normal sailing or motoring activities.

The foregoing describes only one embodiment of the present invention and modifications which are obvious to those skilled in the art may be made thereto without departing from the scope of the invention.

CLAIMS

1. A device for deterring birds from perching, or roosting, on a moored boat, a building or other structure having a broad surface attracting birds for perching, said device comprising electrical circuit means for generating a pulsed electrical voltage at an output, and electrical conduction means supported upon said surface and connected to said output to form electrically charged regions, said regions being arranged in lines in a spread-out pattern with said lines so widely spaced and located to permit movement of a bird between said lines but requiring to be crossed by the bird in its passage to an edge of the surface.

2. A device according to claim 1, wherein said electrical conduction means comprises a pair of electrical conduction leads fixedly mounted upon an electrically insulating layer located upon said surface.

3. A device according to claim 2, wherein said insulating layer is a strip coated on its underside with a pressure-sensitive adhesive for fixing to said surface

4. A device according to claim 2 or 3, wherein said pair of conduction leads are parallel lengths of flexible metal braid sewn onto said insulating layer.

5. A device according to claim 2 or 3, wherein said pair of conduction leads are parallel strips of metallized plastics tape.

6. A device according to any one of the preceding claims, wherein said spacing between adjacent lines of said electrically charged regions is at least 300 mm.

7. A device according to any one of the preceding claims, wherein to provide bird deterrents on rigging and railings of said boat said electrical conduction means is applied on the topside thereof.

8. A device according to any one of the preceding claims, wherein said electrical circuit means comprises a step-up transformer including a transistorised ancillary network associated with its primary winding whereby applied low voltage induces a voltage above 1KV in its secondary winding, and a storage capacitor receiving a charge from said secondary winding and being discharged to said output

by firing of an SCR.

9. A device according to claim 8, wherein firing of said SCR is controlled by a timing circuit including a unijunction transistor.

10. A device for deterring birds substantially as hereinbefore described with reference to the accompanying drawings.

FIG. 1

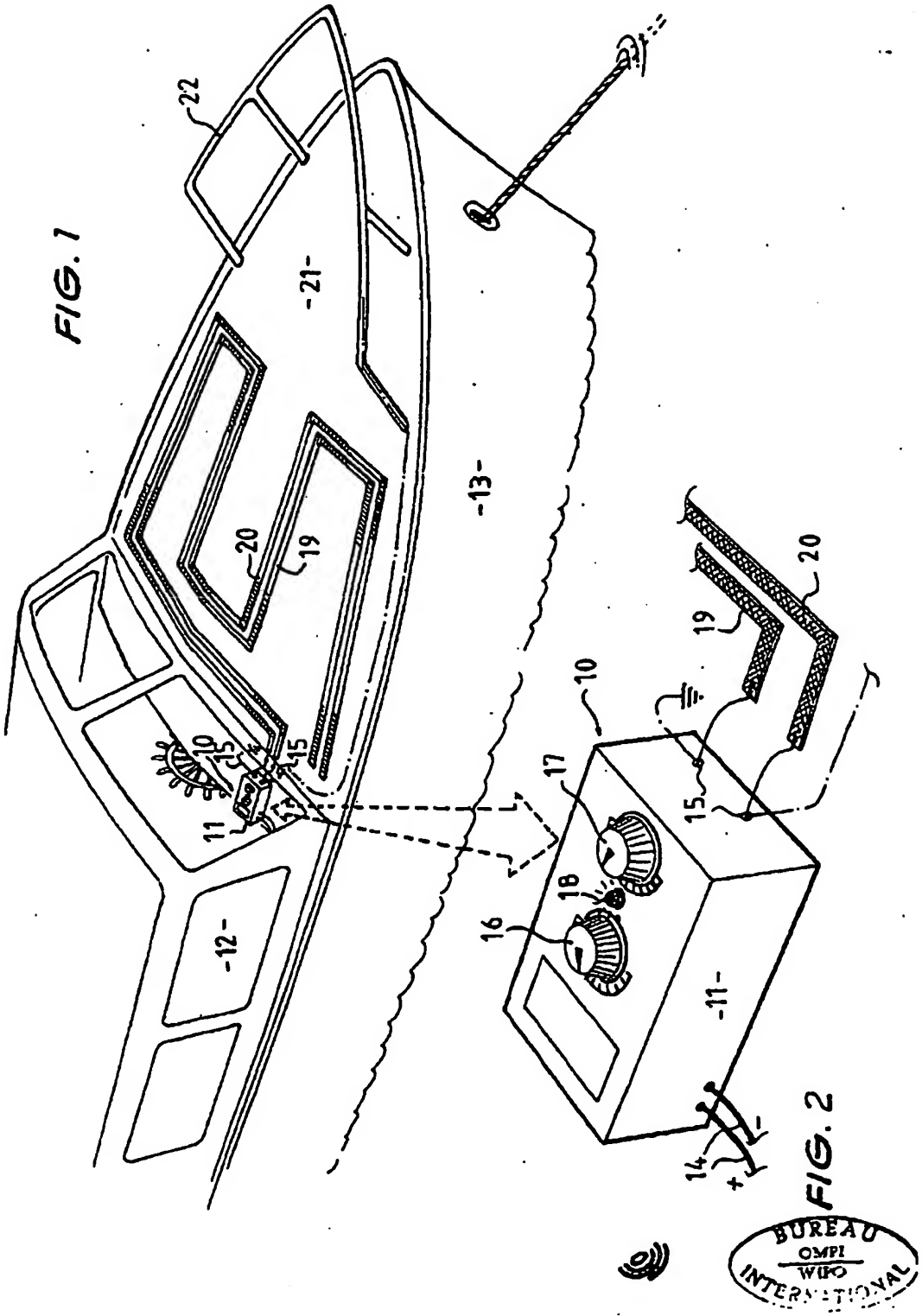


FIG. 2

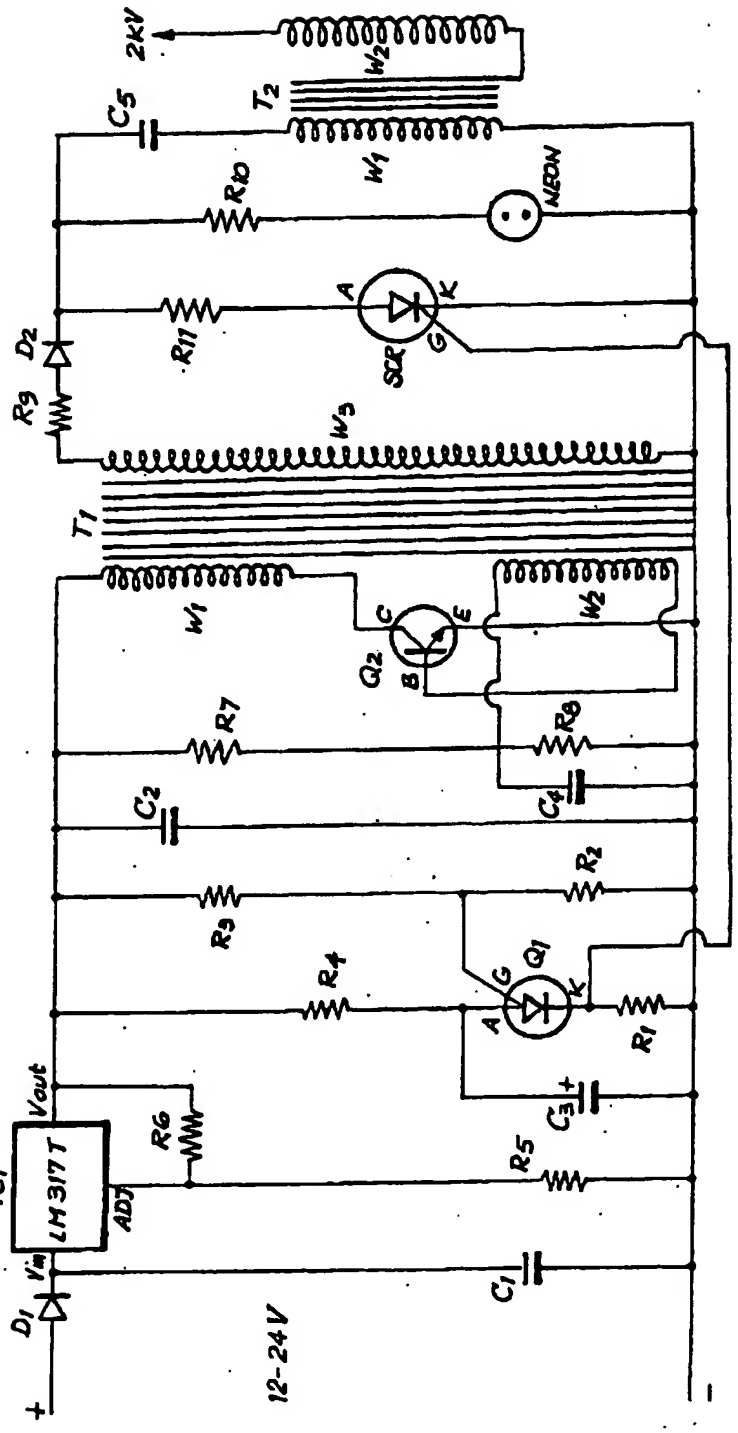
2KV
W2
T2
C5
W1
R10
NEON
A
K
G
SCR
R11
D2
R9
W3
T1
W1
C
E
W2
Q2
B
R7
R8
C4
C2
R2
R3
R4
Q1
G
A
K
R1
C3+
Vout
R6
R5
IC1
LM317T
ADJ
Vin
C1
D1
12-24V
+
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FIG. 3